

Please replace the paragraph on page 1, beginning at line 6 with the following new entry:

The present invention relates to a circuit testing method. In particular, the present invention relates to a testing method for pixel storage capacitance of a thin film transistor display circuit. A reliable and precise testing result of the yield can be obtained in conditions that parasitic capacitance is much larger than a pixel capacitance.

Please replace the paragraph on page 7, beginning at line 9 with the following new entry:

FIG.3 is a connection block diagram 300 of the array tester and the DUT (device under test) in according to one embodiment of the present invention. Array tester 302 including a programmable voltage generator 304, waveform generator 306, precision measurement unit 308, pixel processor 310 and central processing unit/interface 312. Driving signal 316 generated from the programmable voltage generator supplying the necessary voltage to DUT 314, for example, the charge voltage, the driving voltage of the transistors, etc. The device under test could be, for example, liquid crystal display (LCD) panel, organic light emitting diode display (OLED) panel or LCOS (liquid crystal on silicon) panel. The transistor could be, for example, amorphous thin film transistor, poly-Si thin film transistor or re-crystallized silicon thin film transistor. The waveform generator 306 generates the necessary sense amplifier control signal 318 to control the testing performance of the sense amplifier 326. The signal of the pixel transistor is transmitted to the sense amplifier 326 of the sense array 212 from switch 210 (refer to FIG.2) via wire 322, The sensed signal transmit to an A/D converter 324 via a sampling/hold circuit (not shown), then converted to a digital signal, the digital signal is then transmitted to a pixel processor 310 for analyzing via data bus 320, CPU 312 calculates the testing results to form a report or a table for the tester to explain the test results. The circuit connection of FIG.3 is not much different to the prior art, only the structure of the sense amplifier is different and the testing method is not the same.

Please replace the paragraph on page 8, beginning at line 4 with the following new entry:

FIG.4 illustrates an electric circuit of the sense amplifier 400 in according to one embodiment of the present invention. A plurality of sense amplifier 400 forms a sense amplifier array 212. Every sense amplifier including: a trans-impedance amplifier 404, a parasitic capacitance discharge circuit 402, A/D converter 410 and switches SW1, SW2, SW3, SW4 and SW5. The discharge circuit for the parasitic capacitance is an integrator, is implementing an operational amplifier 406, an operation capacitor C_d 412, SW1 and a load resistor 416, The value of the operation capacitor C_d 412 is more than 10pF. The input is connected to the negative input of the operational amplifier 406 via SW2, the positive input is ground, the negative input is connected to the output by SW1 as well as C_d 412, the output is connected to a load resistor 416 then to ground. When SW1 is ON, C_d 412 will discharge. When SW2 ON, the charge of the parasitic capacitance from the input will perform transformation, i.e., to discharge the parasitic capacitance. The trans-impedance amplifier 404 is an integrator, is implementing an operational amplifier 408, an operation capacitor C_{int} 414 and SW3. The input is connected to the negative input of the operational amplifier 408 via SW4, the positive input is ground, the negative input is connected to the output by ~~[[SW1]]~~SW3 as well as C_{int} 414, the output is connected to an A/D converter 410 with sampling /hold circuit via SW5, the output (O/P) of the A/D converter 410 providing the signal to pixel processor. When SW3 is ON, the charge of C_{int} 414 will discharge. When SW3 is OFF, SW4 and SW5 is ON, the charge current from the pixel storage capacitor can be integrating, then transmit to the A/D converter 410 via the sampling /hold circuit, which will transform to a digital signal.

Please replace the paragraph on page 10, beginning at line 3 with the following new entry:

FIG.7 is the flow chart for testing the valid pixel (visible area) in according to one embodiment of the present invention. Steps 702 and 704 are the same as steps 602 and 604. In step ~~[[606]]~~706, using period T_1 of the test waveform of FIG.5 (b), now

SW1 and SW3 are ON, refer to FIG.4, reset (i.e. discharge) the source line parasitic capacitance C_{sp} , the operation capacitor C_d , C_{int} of the discharge circuit 402 and the sense amplifier 404 respectively. In step 708, set SW4 ON in period T_2 of FIG.5 to start the sense amplifier 404. Refer to FIG.2, now set the pixel transistor 204 of column n , row k ON, to integrate the current from the charge of the pixel storage capacitor 206. The integrated voltage is larger than 100mV. This signal voltage is a number of hundred times greater than the results obtained by the prior art. The reliability is increased. Only one testing is enough to get a précised result for each pixel. This will save manpower and time. In step 710, in the period T_3 of FIG.5, set SW5 ON to start the sampling/ hold circuit, the integrated voltage is then transmitting to the ADC and converting to a digital output for process by the pixel processor 310. in step 712, in the period T_4 of FIG.5, set SW2 ON, SW1 OFF, to process charge transfer. The object of this step is as follow: When the pixel storage capacitor discharging to the sense amplifier 404, it also charging the source line of column n very little. As k is increasing, the charge in the parasitic capacitance of column n will accumulate, this will affect the precision of testing. This step is to correct such phenomena. It is value to note that the discharge period is obviously decreased as compare to the discharge period of the invalid pixels in order to decrease testing time and increase testing efficiency. Step 712 is to prepare the measurement of the next pixel (i.e., column n , row $(k+1)$). Because the transfer is done, testing may immediately go to step 714 to test the next pixel.